

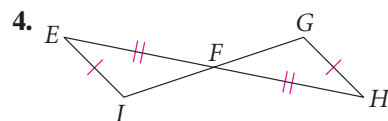
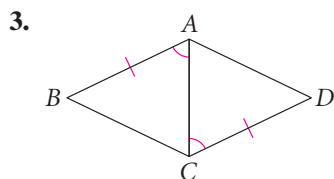
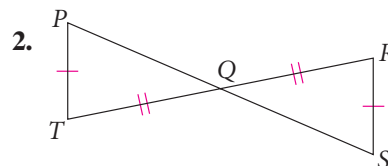
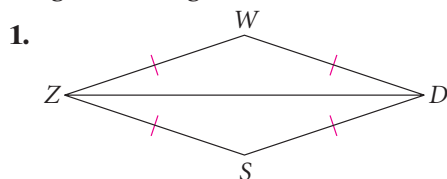
EXERCISES

For more practice, see *Extra Practice*.

Practice and Problem Solving

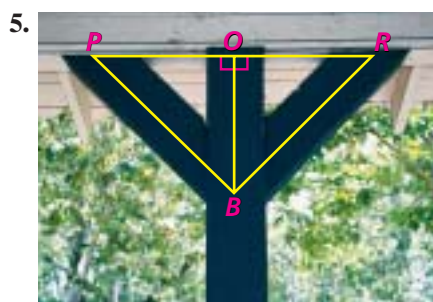
A Practice by Example Examples 1, 3 (pages 187–188)

Developing Proof Which postulate, if any, could you use to prove that the two triangles are congruent?

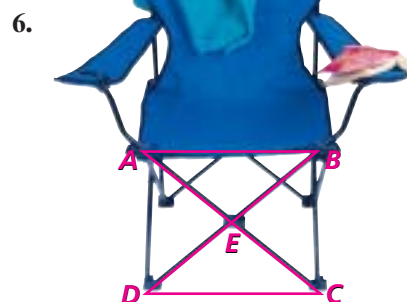


F is the midpoint of \overline{GI} .

Developing Proof Is the information you are given below each photograph enough for you to prove that the two triangles are congruent? Explain.



The vertical beam \overline{OB} is perpendicular to the porch roof. P , O , and R are equally spaced.

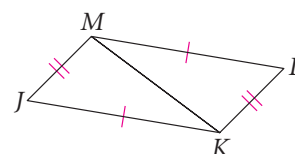
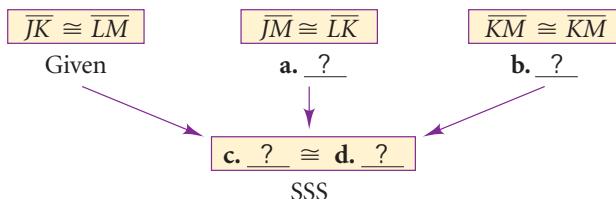


The diagonal legs have equal lengths and are joined at their midpoints.

7. **Developing Proof** Copy and complete the flow proof.

Given: $\overline{JK} \cong \overline{LM}$, $\overline{JM} \cong \overline{LK}$

Prove: $\triangle JKM \cong \triangle LMK$



Example 2 (page 188)

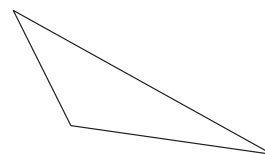
Copy the triangle. Start at any vertex and label the triangle as $\triangle WVU$.

8. What sides include $\angle V$?

9. What angle is included between \overline{WV} and \overline{WU} ?

10. What angles include \overline{UV} ?

11. What side is included between $\angle W$ and $\angle U$?



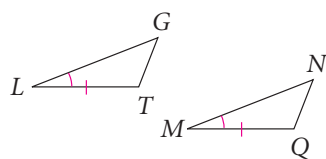
Name the indicated part(s) of $\triangle XYZ$ without drawing $\triangle XYZ$.

12. the angle included between \overline{XY} and \overline{XZ}

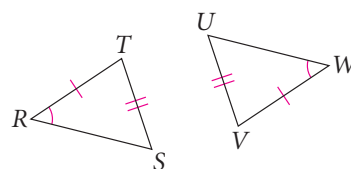
13. the sides that include $\angle Z$

Developing Proof What other information, if any, do you need to prove the two triangles congruent by SSS or SAS?

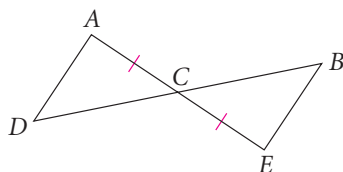
14.



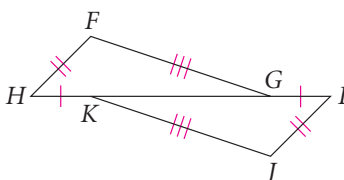
15.



16.



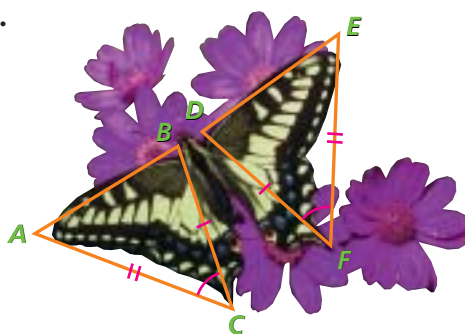
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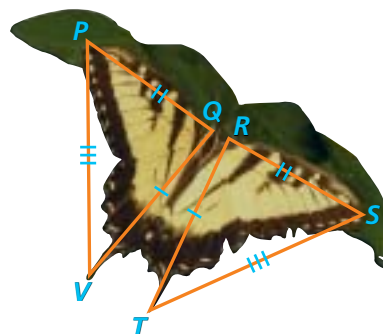
Example 3
(page 188)

Developing Proof From the information given in the diagram, can you prove that the two triangles are congruent? Explain.

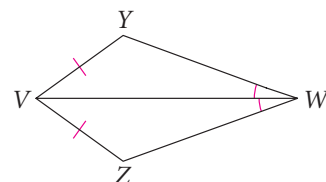
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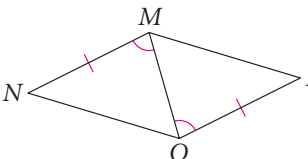
19.



20.



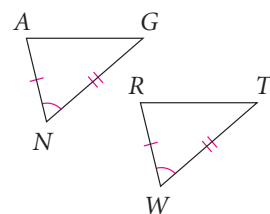
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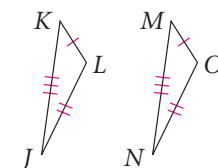
B Apply Your Skills

Developing Proof Is there enough information to prove the two triangles congruent? If so, write the congruence statement and name the postulate you would use. If not, write *not possible* and tell what other information you would need.

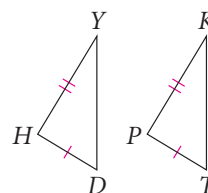
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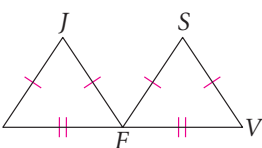
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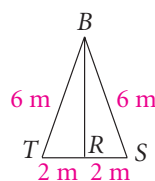
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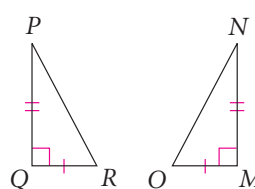
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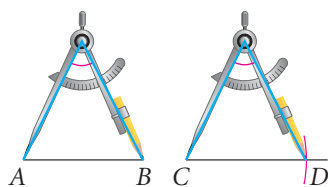


26.



27.





When you construct $\overline{AB} \cong \overline{CD}$, SAS tells you that the triangles outlined here are congruent.

Developing Proof From the information given, can you prove the two triangles congruent? Explain.

28. $\triangle ABC$ and $\triangle DEF$ with $\angle A \cong \angle D$, $\angle B \cong \angle E$, $\angle C \cong \angle F$

29. $\triangle GHI$ and $\triangle JKL$ with $\overline{GH} \cong \overline{JK}$, $\overline{HI} \cong \overline{KL}$, $\angle I \cong \angle L$

30. $\triangle MNP$ and $\triangle QRS$ with $\overline{MN} \cong \overline{QR}$, $\angle N \cong \angle R$, $\overline{NP} \cong \overline{RS}$

Constructions Use a straightedge to draw $\triangle JKL$. Construct $\triangle MNP \cong \triangle JKL$ using the given postulate.

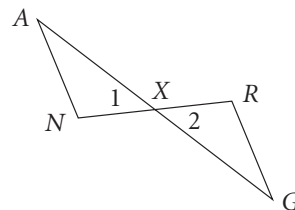
31. SSS

32. SAS

33. **Developing Proof** Supply the reasons in this proof.

Given: X is the midpoint of \overline{AG} and of \overline{NR} .

Prove: $\triangle ANX \cong \triangle GRX$



Statements	Reasons
1. $\angle 1 \cong \angle 2$	a. ?
2. X is the midpoint of \overline{AG} .	b. ?
3. $\overline{AX} \cong \overline{GX}$	c. ?
4. X is the midpoint of \overline{NR} .	d. ?
5. $\overline{NX} \cong \overline{RX}$	e. ?
6. $\triangle ANX \cong \triangle GRX$	f. ?

34. **Error Analysis** A friend conjectures that there should be an AAA Congruence Postulate since there is a SSS Congruence Postulate. Give a counterexample to disprove your friend's conjecture.



35. a. **Open-Ended** List three real-life uses of congruent triangles.

b. **Writing** For each, tell whether you think congruence is necessary and why.



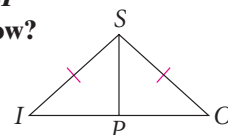
Reading Math

For help with reading and solving Exercise 36, see p. 193.

Developing Proof What can you prove about $\triangle ISP$ and $\triangle OSP$ given the information in the diagram and the information below?

36. \overline{SP} is the bisector of $\angle ISO$.

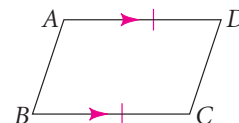
37. \overline{SP} is a bisector of \overline{IO} .



Developing Proof In $ABCD$, $\overline{AD} \parallel \overline{BC}$ and $\overline{AD} \cong \overline{BC}$. Can you prove the two triangles congruent? Explain.

38. $\triangle ADB$ and $\triangle CBD$

39. $\triangle ABC$ and $\triangle CDA$

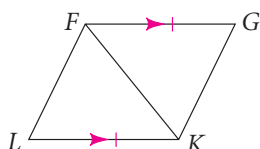


40. **Critical Thinking** Four sides of polygon $ABCD$ are congruent to four sides of polygon $EFGH$. Must the two quadrilaterals also be congruent? Explain.

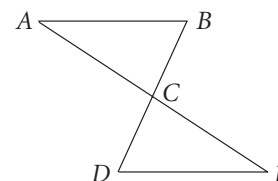


Challenge Proof Write a proof.

41. **Given:** $\overline{FG} \parallel \overline{KL}$, $\overline{FG} \cong \overline{KL}$
Prove: $\triangle FGK \cong \triangle KLF$

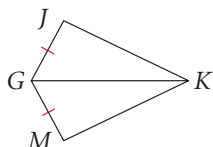


42. **Given:** \overline{AE} and \overline{BD} bisect each other.
Prove: $\triangle ACB \cong \triangle ECD$



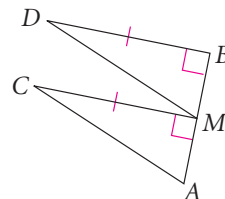
43. **Given:** \overline{GK} bisects $\angle JGM$,
 $\overline{GJ} \cong \overline{GM}$.

Prove: $\triangle GJK \cong \triangle GKM$



44. **Given:** $\overline{AB} \perp \overline{CM}$, $\overline{AB} \perp \overline{DB}$, M is the midpoint of \overline{AB} , $\overline{CM} \cong \overline{DM}$.

Prove: $\triangle AMC \cong \triangle BMD$



Standardized Test Prep

Multiple Choice

Use the figures at the right for Exercises 45–47.

45. Suppose $\overline{TM} \cong \overline{GL}$ and $\angle M \cong \angle G$.

What additional information is needed to prove $\triangle TMD \cong \triangle GLS$ by SAS?

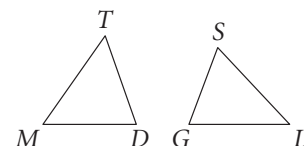
- A. $\angle T \cong \angle L$ B. $\angle T \cong \angle S$ C. $\overline{TD} \cong \overline{SL}$ D. $\overline{MD} \cong \overline{SG}$

46. Suppose $\overline{TD} \cong \overline{SG}$ and $\overline{MD} \cong \overline{SL}$. What additional information is needed to prove the two triangles congruent by SAS?

- F. $\angle T \cong \angle S$ G. $\angle D \cong \angle S$ H. $\angle S \cong \angle L$ I. $\angle D \cong \angle G$

47. Suppose $TD = 10$ cm, $DM = 9$ cm, $TM = 11$ cm, $SL = 11$ cm, and $SG = 9$ cm. What else do you need to know in order to prove that the two triangles are congruent by SSS?

- A. $LG = 9$ cm B. $TD = SL$ C. $GL = 10$ cm D. $TM = SG$



Short Response

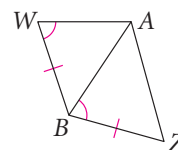


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48. In the diagram, $\overline{WB} \cong \overline{BZ}$ and $\angle W \cong \angle ABZ$.

- a. State another conclusion you can make.
 Name the property that justifies your conclusion.
- b. Based on the information given in the diagram, can you prove the two triangles congruent? Justify your answer.



Mixed Review

Lesson 4-1

$ABCD \cong EFGH$. Name the angle or side that corresponds to the given part.

49. $\angle A$ 50. \overline{EF} 51. \overline{BC} 52. $\angle G$

Lesson 2-2

53. The following two statements are about lines with defined slopes. Combine them into a single biconditional.
 If the product of the slopes of two lines is -1 , then the lines are perpendicular.
 If two lines are perpendicular, then the product of their slopes is -1 .
54. Write the two conditional statements that form this biconditional:
 $x = 2$ if and only if $2x = 4$.

Lesson 2-1

Write the converse of the statement. Decide whether the statement and its converse are true or false.

55. If $x = 3$ then $2x = 6$. 56. If $x = 3$ then $x^2 = 9$.